REMARKS

Applicants wish to thank the Examiner for the very thorough consideration given the present application. The Office Action of **September 26, 2000**, has been received and its contents carefully noted.

Due to the above actions, claims 7, 13, 19, 24, 30, and 53 have been preliminary amended and new claims 62-64 have been added to further provide a feature that the crystallization of the semiconductor film using a laser beam is conducted through the insulating film on the semiconductor film. Accordingly, claims 1-19, 21-24 and 26-64 are now pending in this application and are believed to be in condition for allowance for the reasons advanced below.

The Office Action rejects claims 1-19, 21-24 and 26-61 under 35 USC §103(a) as being unpatentable over ***Chang*** (U.S. Patent 5,064,775) in view of ***Wolf et al.*** and ***Han et al.*** (U.S. Patent 4,599,118). This rejection is respectfully traversed for the following reasons and favorable consideration is kindly solicited in view thereof.

The present invention is generally directed to a method for fabricating a semiconductor device wherein a protective film is formed over a semiconductor film, an impurity such as boron is introduced into the semiconductor film through the protective film, the semiconductor film is crystallized, and the protective film is removed. In addition, the crystallization of the semiconductor film can be conducted using a laser beam irradiated through the protective film.

As the Examiner well knows, three criteria must be met to establish a *prima facie* case of obviousness. *M.P.E.P.* §2143. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings to achieve the claimed invention. *Id.* Second, there must be a reasonable expectation of success. *In re Rhinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976). Third, the prior art must teach or suggest all the claim limitations. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Applicants respectfully submit that the Office Action fails to set forth a *prima facie* case of obviousness based upon the applied references, and that the present invention is patentably distinct over the prior art. More particularly, Applicants respectfully contend that the proposed

Chang modification fails to expressly teach or implicitly suggest removing an insulating film formed on a semiconductor film after introducing boron, newly forming a gate insulating film on the semiconductor film or crystallizing the semiconductor film using a laser beam. Accordingly, the presently claimed invention would not have resulted even if one skilled in the art combined the method for fabricating a transistor taught in ***Chang*** with the process for adding a silicon oxide layer on the silicon substrate as taught in ***Wolf***.

Moreover, there is a lack of suggestion as to why a skilled artisan would use the proposed ***Chang*** modification to achieve the unobvious advantageous properties first recognized by Applicants. "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). The claimed invention is particularly advantageous in providing a semiconductor device having enhanced electrical characteristics. The impurity concentration of boron, for example, is higher near the surface of a material into which the boron is implanted. When boron is implanted into a semiconductor layer, such as silicon, the same concentration profile is realized wherein a higher concentration of boron is found near the surface of the silicon layer, and the concentration decreases through the silicon film. The higher concentration at the surface of the silicon film, however, degrades the performance of the resulting device. Thus, in accordance with the claimed invention, a protective layer of silicon oxide, for example, is formed over a semiconductor layer prior to the implantation of impurities. Subsequently, the protective layer is removed, resulting in a semiconductor layer having an impurity concentration profile which is desirable for a semiconductor device.

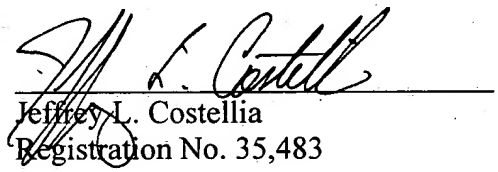
Furthermore, in accordance with the claimed invention, the protective layer used during the impurity implantation process is removed and a further gate insulating film is formed for use in the device. The protective layer is not used as a gate insulating film since the presence of boron will reduce the breakdown voltage between the channel and gate electrode, thus degrading device performance. It is respectfully submitted that the proposed ***Chang*** modification fails to

expressly disclose or implicitly suggest the unobvious advantageous properties of the claimed invention.

Consequently, since the proposed ***Chang*** modification fails to teach or suggest all the claim limitations, and also fails to teach or suggest the unobvious advantageous properties resulting therefrom, Applicants respectfully request that the claimed invention is patentably distinct over the prior art.

Examination on the merits is respectfully requested.

Respectfully submitted,



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Marked-copy of amended claims.

7. (Amended) A method according to claim 6 wherein said channel region is substantially intrinsic type or [n-type] p-type.

13. (Amended) A method according to claim 12 wherein said channel region is substantially intrinsic type or [n-type] p-type.

19. (Amended) A method according to claim 18 wherein said channel region is substantially intrinsic type or [n-type] p-type.

24. (Amended) A method according to claim 23 wherein said channel region is substantially intrinsic type or [n-type] p-type.

30. (Amended) A method according to claim 23 wherein said channel region is substantially intrinsic type or [n-type] p-type.

53. (Amended) A method for fabricating a semiconductor device, said semiconductor device having at lest one thin film transistor comprising a semiconductor film formed adjacent to a gate electrode with a gate insulating film therebetween, said method comprising the steps of:

forming said semiconductor film over a substrate;

forming an insulating film on said semiconductor film;

introducing boron into at least a portion of said semiconductor film through said insulating film, said portion becoming at least a channel region of said thin film transistor; and

removing said insulating film.